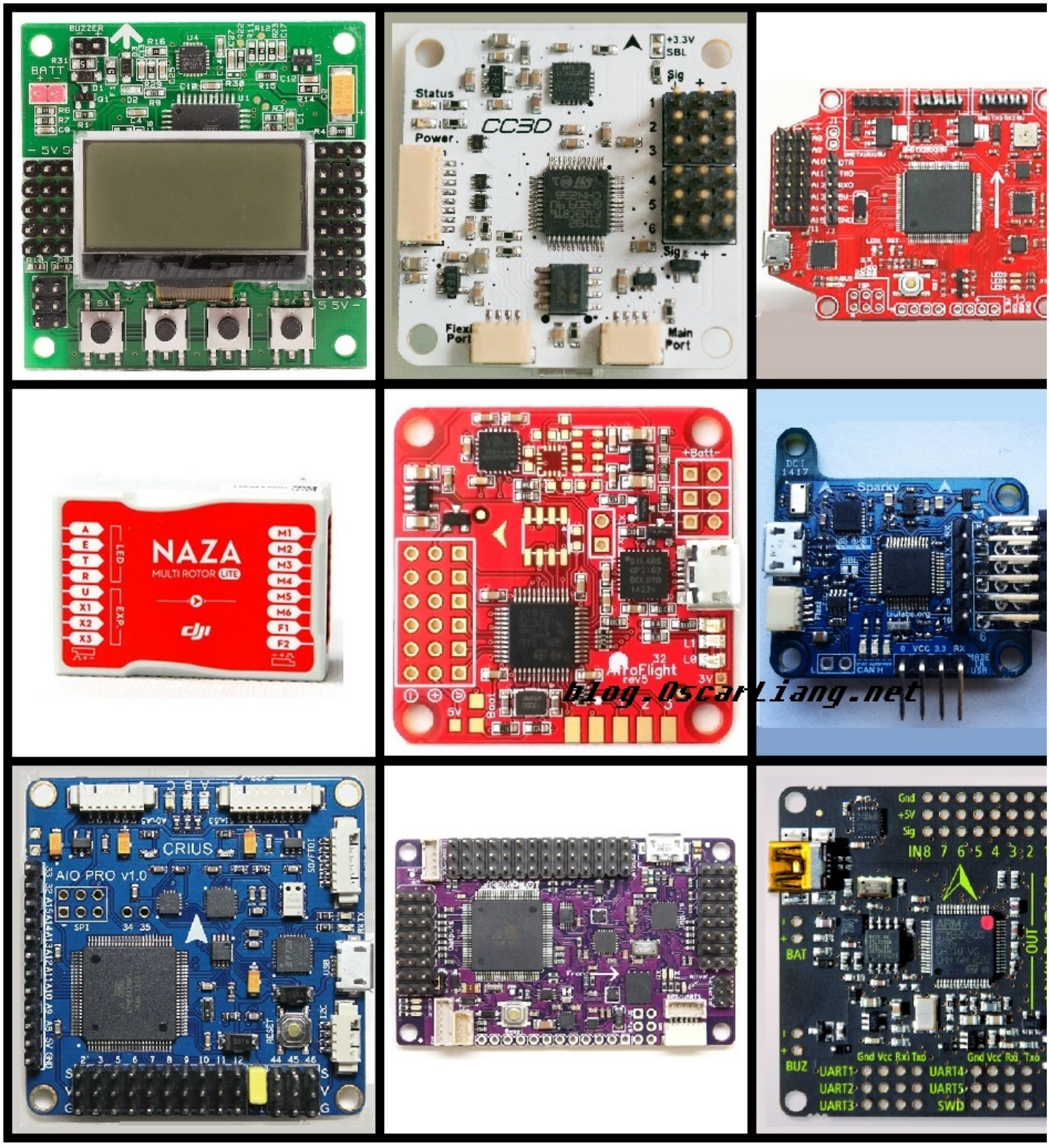
FPV Drone Flight Controller Explained

Published: 10th February 2020 | **Last Updated on** 23rd July 2021



The number of flight controllers (FC) for FPV drones can be overwhelming for beginners. This guide ex
all the features and differences, and highlights important factors to consider when choosing a mini qua

If you are new to the hobby, check out our FPV drones beginners guide to learn more.

I compiled the specifications of all FC's in this spreadsheet so you ca compare them more closely

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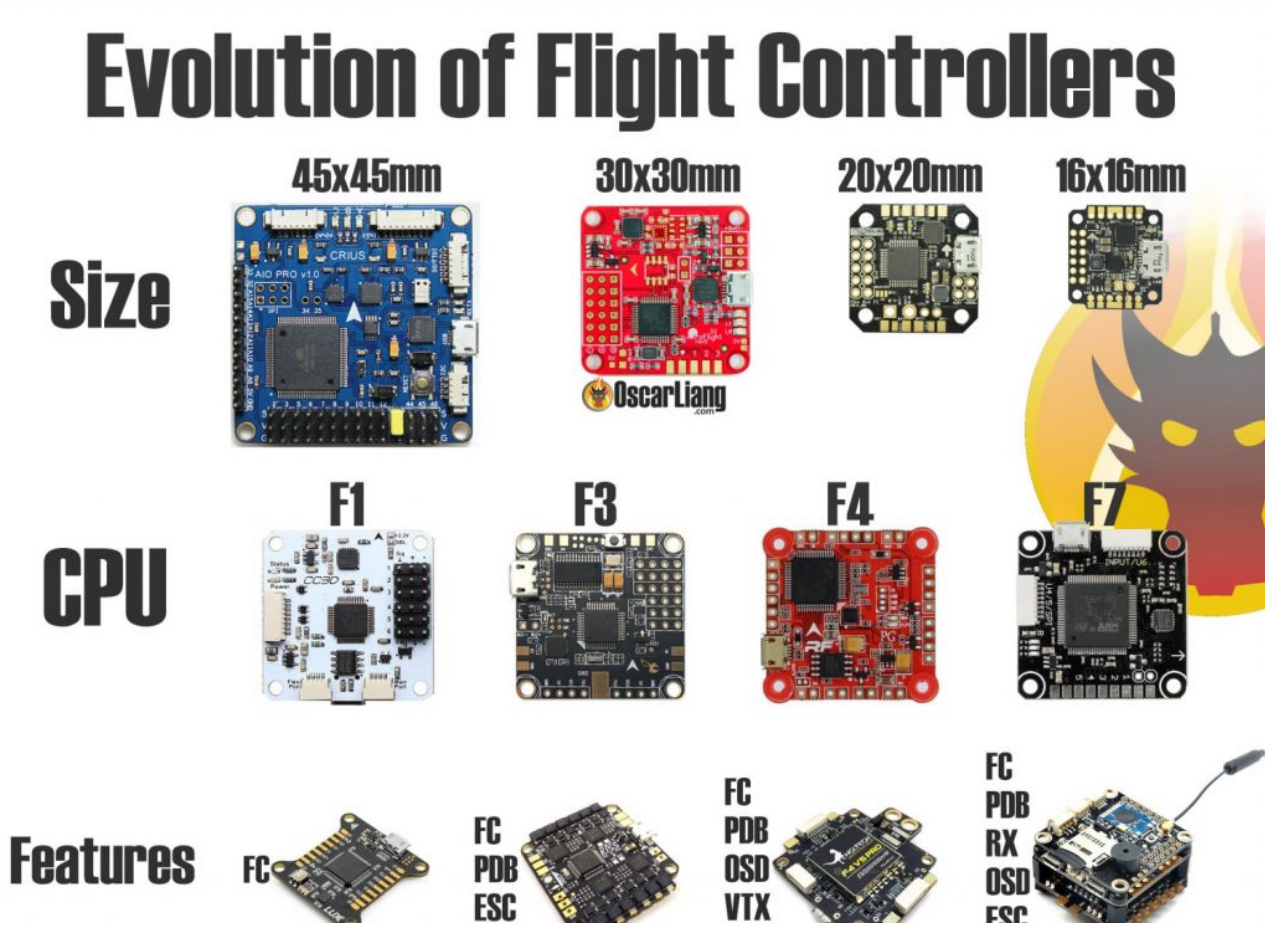
What is a Quadcopter Flight Controller

The flight controller (a.k.a FC) is the brain of the aircraft. It's a circuit board with a range of sensors tha movement of the drone, as well as user commands. Using this data, it then controls the speed of the n to make the craft move as instructed.

Nearly all flight controllers have basic sensors such as Gyro (Gyroscopes) and Acc (Accelerometer). S FC include more advanced sensors such as Barometer (barometric pressure sensors) and magnetom (compass).

The FC is also a hub for other peripherals, such as GPS, LED, Sonar sensor etc.

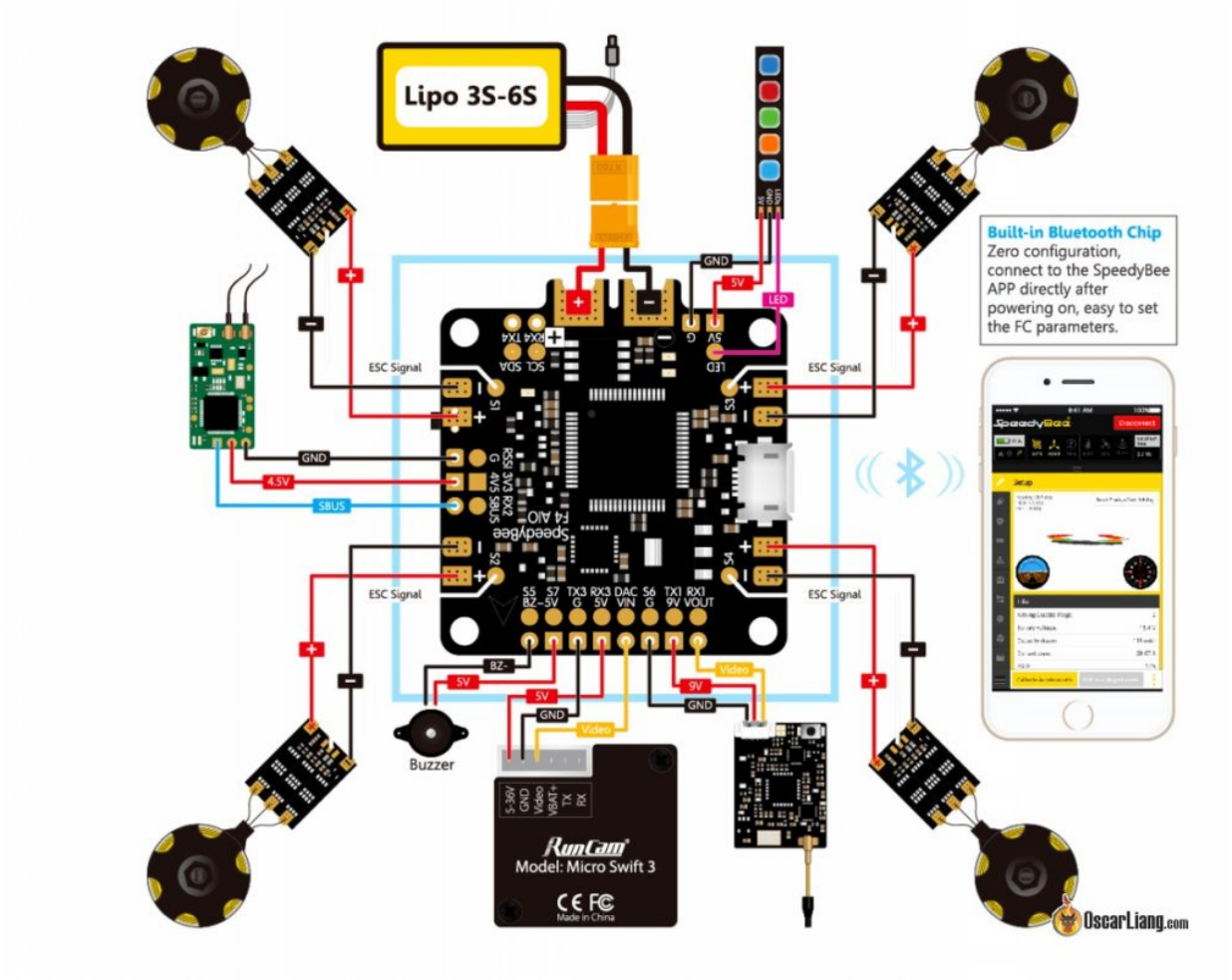
FPV drone flight controllers are rapidly evolving: becoming smaller, with more features integrated, and better processors and hardware.



Flight controller sizes, MCU and features

FC Connection

Here is an example wiring diagram how components in a drone are connected to a flight controller.



Flight Controller Firmware

In addition to hardware options, there is also different firmware you can choose to run on your FC, whi different features and specializations for various applications. For example iNav is designed with GPS utilization in mind, whereas KISS is more focused on racing and ease of use.

Here is a list of popular FC firmware available for mini quad. If you have no clue which one to choose, recommendation would be Betaflight.

Flight Controller Firmware

Betaflight is open-source, developed and maintained by the community. It has the biggest user base, s will be more likely to get help when you run into problems. It also has the widest range of flight controll

Other popular firmware for FPV drones are FlightOne and KISS. They are both closed source, and the hardware and firmware are controlled by private companies so you are limited to their own flight contro

Once you have picked your FC firmware, you can look for a compatible flight controller board.

Interface and Configuration

Modern FC firmware can be configured via a computer, smartphone, or even from your radio controller firmware offers a different user interface (UI) with various parameters you can change. Some UI looks but plugging the same settings into a different FW can give very different characteristics, so there is a curve when getting into a new firmware.

*"**Tuning**" is the term we use in the multirotor hobby when changing parameters such as PID, RC ra or other settings to achieve the flight characteristics we want.*

Processor

The processors in FC are also known as micro controller units (MCU), they are used to store the firmw codes and handling all the complex calculations.

Currently, there are 5 main types of MCU used for FC's: F1, F3, F4, F7 and H7. The main differences l the calculation speed and memory size:

	F1	F3	F4	F7	H7
Speed	72MHz	72MHz	168MHz	216MHz	480M
Memory	128KB	256KB	1MB	1MB	128I

This article explains the differences between F1, F3, F4 and F7 MCU in more detail.

We recommend getting either an F4 or F7 flight controller, because F1 and F3 are no longer supported latest versions of Betaflight due to the lack of storage for the expanding firmware.

FC Processors: from left to right: STM32 F1, F3, F4

What is UART in Flight Controller?

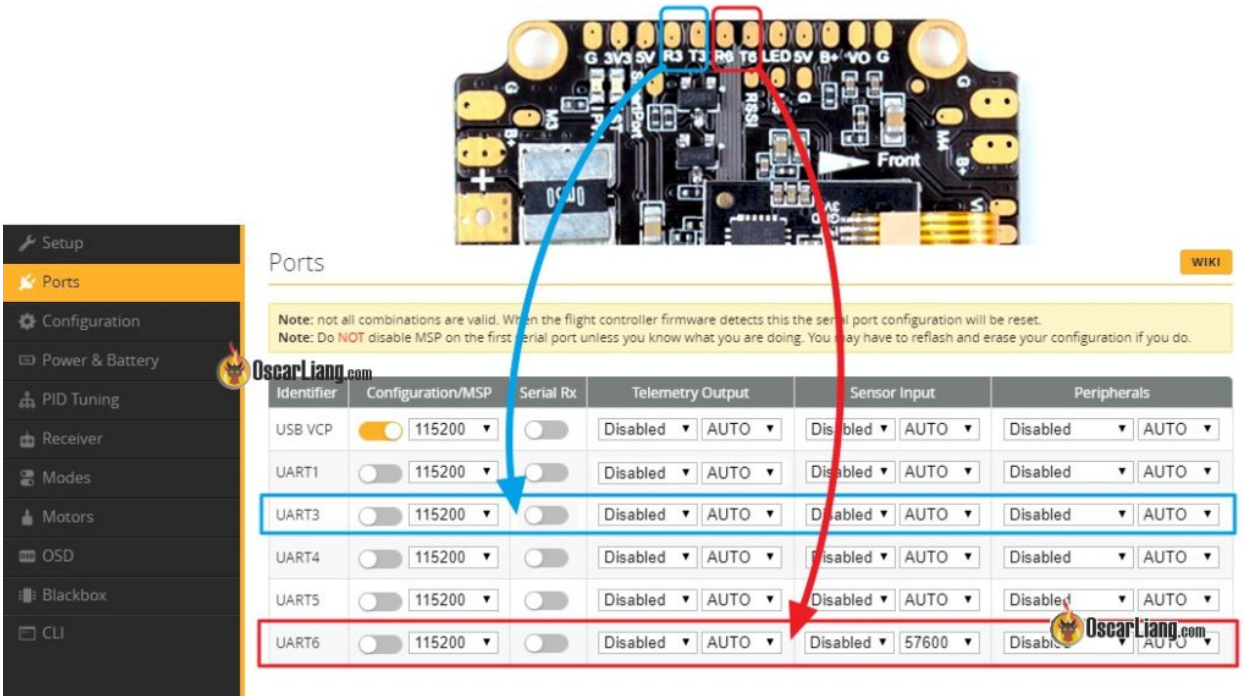
UART stands for **Universal Asynchronous Receiver/Transmitter**.

UART is the hardware serial interface that allows you to connect external devices to the flight controlle

example, serial radio receivers, Telemetry, Race Transponder, VTX control etc.

Each UART has two pins, TX for transmitting data and RX for receiving. Remember the **TX** on your pe connects to the **RX** on the FC, and vice versa.

For example here are the UART3 (R3 and T3 pins) and UART6 (R6 and T6 pins) on a flight controller. can assign these UART a task in the ports tab of Betaflight configurator.



How Many UART's on an FC

You might not need many UART's, but having more is always handy.

The number of UART's available largely depends on design of the board, and the processor used. For example, F1 FC normally only has 2 UART's, while F3 and F4 can have between 3 to 5 and F7 can ha 7.

	F1	F3	F4	F7
No. of UART	2	2-5	2-5	3-7

UART and Inverted Signal

F3 and F7 can handle inverted signals natively, while F1 and F4 cannot.

Frsky SBUS and SmartPort signals are inverted at the output, the good news is F3 and F7 flight contro can read these signals just fine. Because they are newer generation processors with integrated inverte

However, older processors such as F1 and F4, require an external inverter to “translate” the signal bef feeding it to the UART. For users convenience, almost all F4 flight controllers have dedicated pads for you can connect the RX directly to. Otherwise, you can use a workaround, such as using soft serial fo SmartPort, or getting uninverted signal from the RX.

If you are running out of UART ports, you can use the Betaflight feature SoftSerial to “create” up to two UART. SoftSerial is a way of emulating a UART port using software, but the emulated UART has lowe rate (update rate). This makes it unsuitable for timing critical tasks such as for the RX connection. Note SoftSerial also increases CPU load.

Gyro Sensor – The IMU

The job of an IMU sensor is to measure the quadcopter’s movement and orientation. An IMU sensor c both an accelerometer (ACC) and a gyroscope (Gyro).

The most used flight modes in Betaflight are probably Acro mode (aka manual mode) and Angle mode self-level mode). Acro mode uses only the Gyro, while Angle mode uses both the ACC and Gyro.

Since most FPV drone pilots only fly in Acro Mode, the accelerometer is often turned off to free up pro power. That’s why we normally refer to the IMU simply as the gyro.

The following list contains the most common IMU chips for FC.

The Types of IMU

Two main gyro manufacturers for FPV drone FC, InvenSense (bought by TDK) and Bosch. Bosch gyro two models, BMI160 and BMI270, currently only Radix FC is using BMI160, everybody else is using InvenSense gyros.

Here’s a list of gyro made by InvenSense.

IMU	Possible Communication Protocol (BUS)	Max. Effective Gyro Sampling Freque
MPU6000	SPI, i2c	8K
MPU6050	i2c	4K
MPU6500	SPI, i2c	32K
MPU9150*	i2c	4K
MPU9250*	SPI, i2c	32K
ICM20602	SPI, i2c	32K
ICM20608	SPI, i2c	32K
ICM20689	SPI, i2c	32K

* **MPU9150** is effectively MPU6050 with an integrated AK8975 magnetometer, while **MPU9250** is MPU with the same magnetometer

You can find the IMU model number printed on the chip, for example this is the popular Invensense MPU-6000.

Gyro and Accelerometer on a flight controller

The Choice of Gyro: Sampling Rate vs. Noise

There are two main properties of an IMU to consider in a flight controller: max sampling rate, and how susceptible to noise (both electrical and mechanical).

Currently the most widely used IMU is **MPU6000** as it supports up to 8KHz sampling rate, and is prove one of the most robust IMU against noise. The general consensus is to avoid **MPU6500** and **MPU925(despite their higher sampling speed.

The **ICM20689** is also pretty good but allegedly with a higher failure rate. The **ICM20602** however is m susceptible to noise and probably should be avoided.

There are some FC with the Gyro “soft mounted” on foam in order to reduce calculation errors from vib being transferred into the system from the motors.

Soft mounted Gyro – Kakute F4

Update (Oct 2019): Since Betaflight 4.1, 32KHz mode has been removed, so even if you are using an gyro with Betaflight, you can only run up to 8KHz looptime. So the 32Khz sampling isn’t an advantage anymore compared to MPU6000.

One of the reasons Betaflight removed 32KHz support may be due to the fact that faster gyro is a doul

edged sword. A smooth craft with clean signal and power, can expect the ICM series at 32KHz to perf better than the MPU6000 at 8KHz. However, with electrical noise from ESC and physical vibrations, ar degradation in performance of the ICM can become worse than the MPU6000.

Here are some tips on soft-mounting and filtering capacitors to reduce noise.

Gyro BUS – i2c and SPI

SPI and **i2c** are the types of "BUS", or communication protocol between the IMU sensor and processo type of BUS has a significant impact on the effective sampling rate and the maximum flight controller l

The preferred BUS is **SPI**, which allows you to run Gyro at a much higher refresh rate than **I2C** which limit of 4KHz. Almost all flight controllers today uses SPI.

Layout

FC layout is where the pins / solder pads are located on the board, and how easy it is to connect the components.

Many people only care about the capability of a flight controller, and can overlook the importance of th

A good example would be the CLRacing F7 and the Kakute F7. Both are excellent flight controllers tha personally recommend, but purely based on the layout, the CLRacing F7 is clearly superior, as all the are all located on the edges, and grouped by the function. The pads on the Kakute are all crammed int same area, which often results in messy wiring.

CL Racing F7 FC

Kakute F7 FC

It's a personal thing, not everyone has the same taste in FC layout.

"All In One" (AIO) FC & Integration

An "All In One" FC has in-built power distribution and will have large pads for the heavy gauge wire for voltage directly from your LiPo. The term was originally used back when it was standard to have a PDI regulate power to your FC, but with the variety of components found integrated with FC's these days, i become more misleading.

One of the first components to be integrated with the FC was On-Screen Display (OSD) – Betaflight O

Other integrated circuitry that has proven invaluable is the Current Sensor: it's a much better indicator VBAT for when you should land and great tool for testing – More about current sensor and calibration.

Other commonly integrated components include Barometer and magnetometer (compass).

There is no "true" all-in-one solution (not yet anyway), but you can find almost any component – RX, V

even ESC's – integrated with the FC.

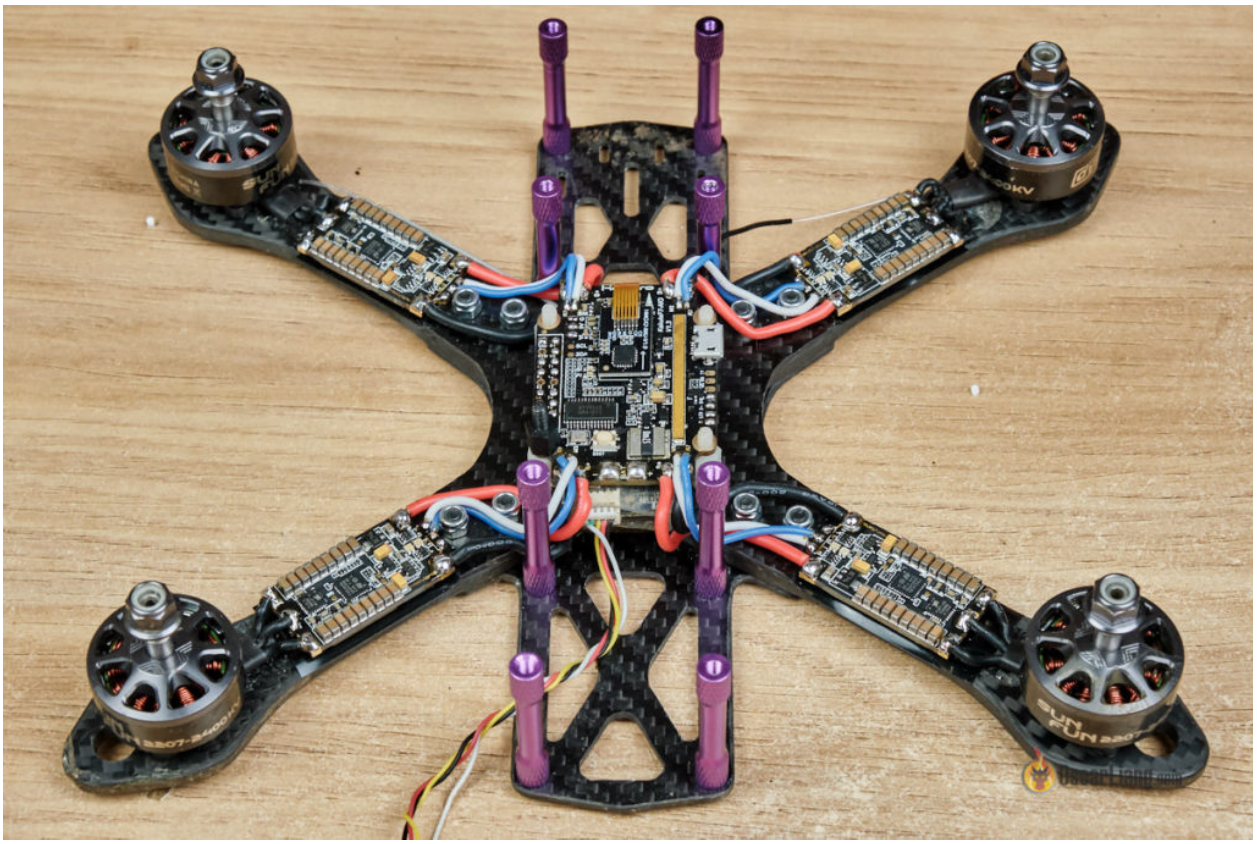
The RacerStar Tattoo F4S FC was the first ESC integrated FC I reviewed, although it wasn't very relia

4-in-1 ESC & AIO FC?

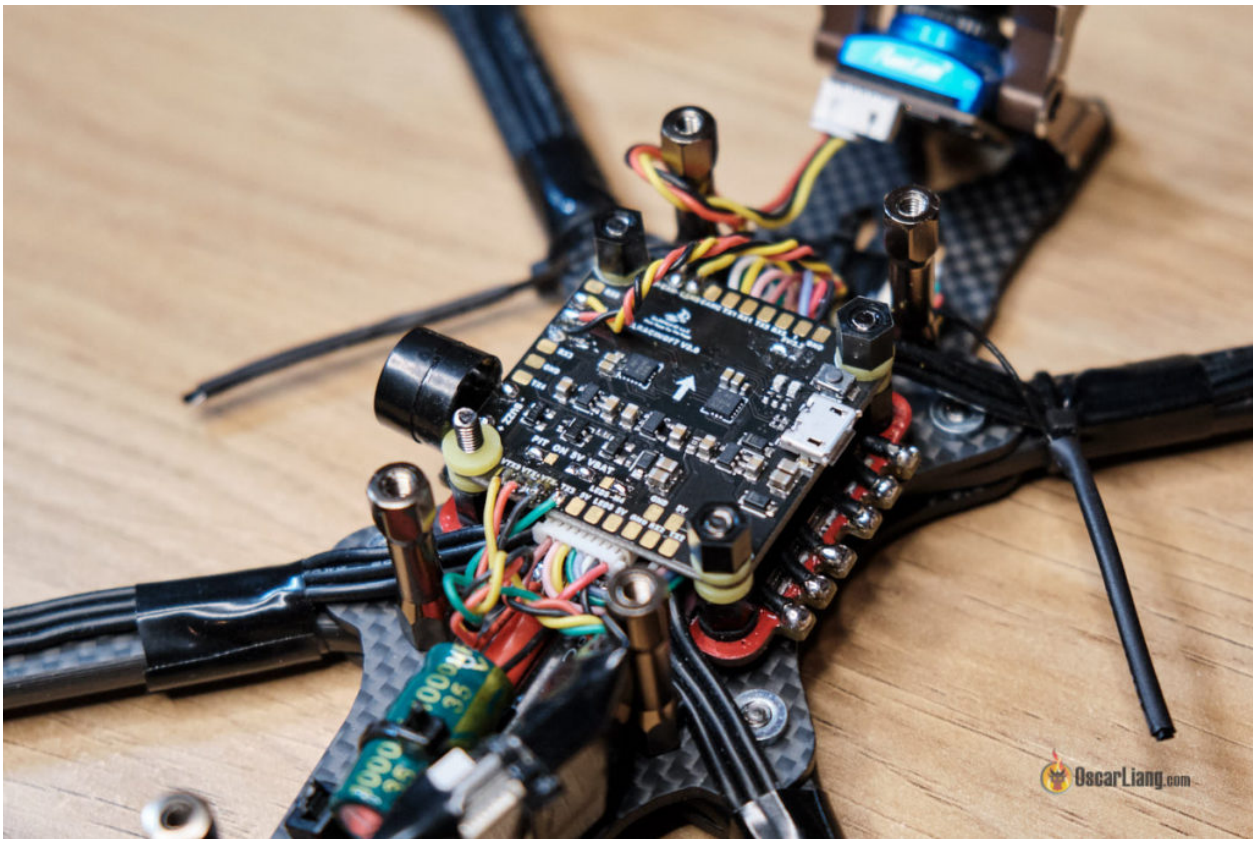
4-in-1 ESC's are common these days, and are often designed as part of a "stack" for use with a specif usually a 4-in-1 ESC acts as the PDB. The plugs and connections from a 4-in1 ESC to the FC are not standardized so ensure your parts are compatible before you purchase.

Can an AIO FC and 4-in-1 ESC be used together? Yes they can, but we don't recommend it.

Depending on the type of ESC you want, use an AIO FC with separate ESC's.

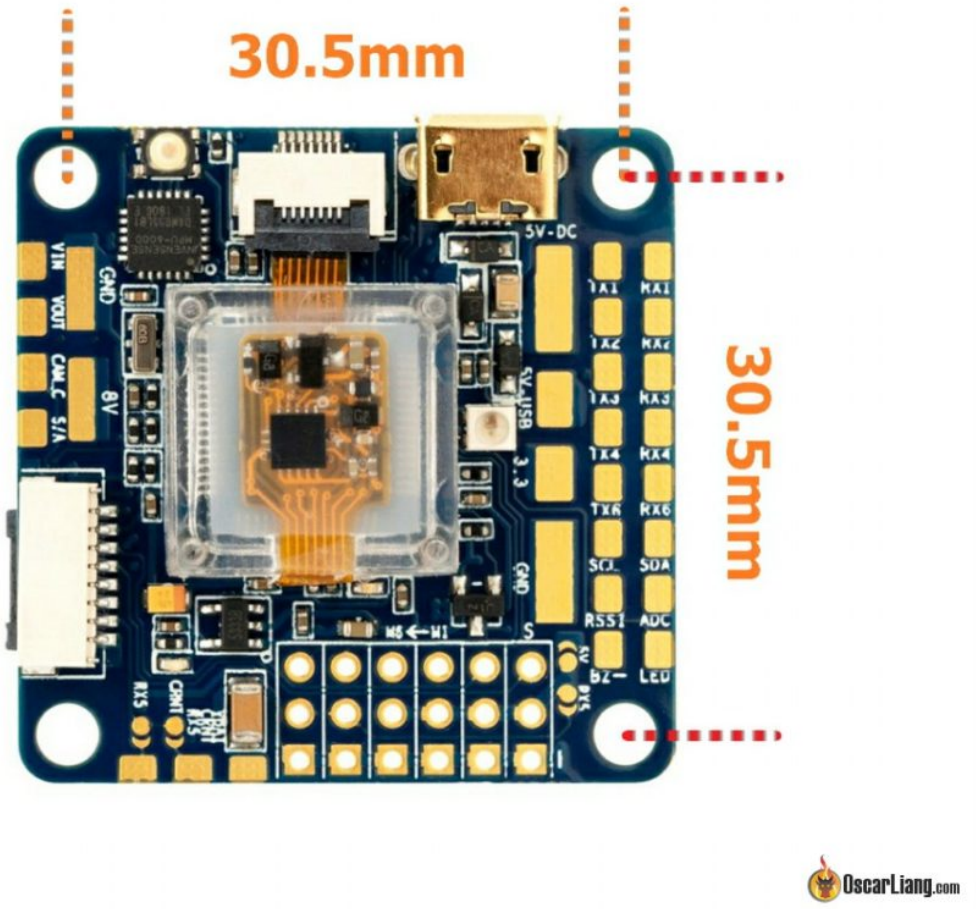


A Non-AIO FC should be coupled with a PDB for individual ESC's or a 4in1 ESC.



Mounting Pattern

The mounting pattern is the hole distance in a flight controller. Common mounting patterns are 30.5×3(
20×20mm and 16×16mm. The mounting pattern is largely determined by the size of the board, and the
the aircraft it's designed for. 5″ and larger aircraft normally use 30.5×30.5mm while anything smaller us
20×20mm. 16×16mm are getting popular with micro builds under 100mm.



Other Flight Controller Features

Blackbox: Flash Memory or SD Logger?

Blackbox data is useful for tuning and troubleshooting.

There are two ways to record your blackbox data – storing your flight logs either on an SD card or inte flash memory.

Flash memory is cheaper to use, but it's also very limited in terms of how long you can record. Depen your logging rate and the amount of flash memory on your FC, you can usually only capture 10 to 20 r minutes of flight data. It's also extremely slow to download, taking up to 5 mins to download a one-min flight log.

Flight controllers with a built-in SD card reader allows you to insert an SD card allowing you to record f weeks without worrying about running out of space. It's also very fast to read the data, take the card o you can access the logs immediately.

Blackbox logs are really for more experienced pilots to diagnose almost imperceptible issues with fligh characteristics, such as racers looking to squeeze out every last drop of performance. For the average hobbyists, perhaps this is unnecessary unless you are really into tinkering.

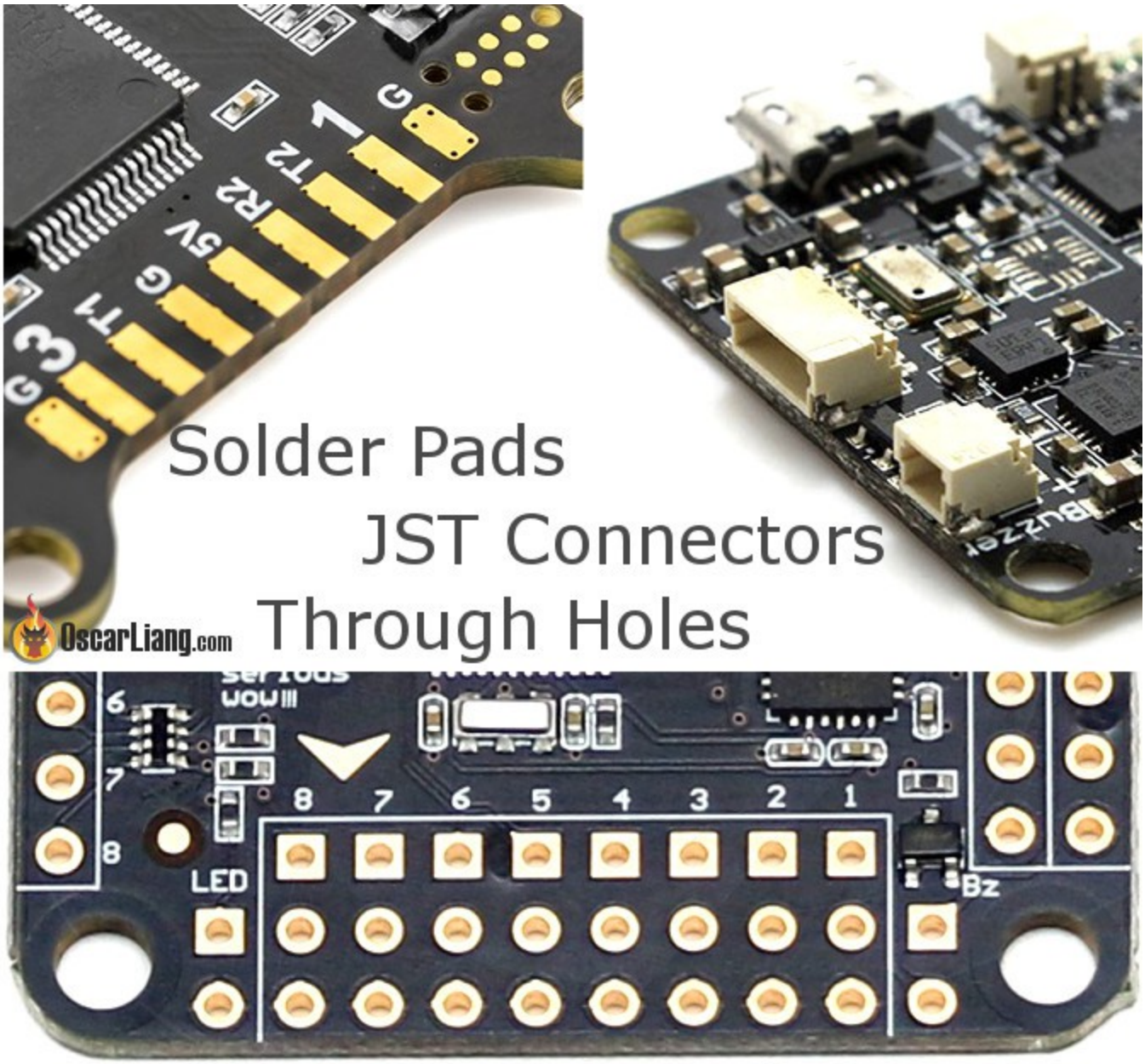
If your FC doesn't have SD card slot nor flash memory for blackbox, you can get an external SD card r (Open Logger) and connect it to your FC via UART.

Connector Types

The three main types of connectors on a flight controller are

- Plastic JST connectors
- Solder pads
- Through holes

Plastic JST connectors are less durable although they allow you to connect/disconnect wires more eas Solder pads are more robust, but you can run into risk of tearing them out when stressed or overheate soldering. Through holes are flexible as it gives you the option of direct soldering or using header pins.



- Pro Tip: How to remove header pins on a FC.
- Pro Tip: With solder pads, did you know that it's possible to fix them if they peel off?

BEC (Voltage Regulator)

The majority of FC's provide a regulated 5V pad. Some even provide 9V, 12V or some other voltages. voltage regulators are often referred to as "BEC" (battery eliminator circuit).

Although a lot of FPV gear (FPV camera and VTX) can now be powered directly from the LiPo battery, found it produces better results powering them from a regulated power source.

Learn about how to wire FPV setup to reduce noise.

Camera Control

A feature that allows you to configure FPV camera settings using your radio transmitter and Betaflight
Learn more about camera control here.

Boot Button

A boot button (or bootloader button) can put FC into bootloader mode when pressed. This allows you t
"force" flash firmware in case normal firmware flashing doesn't work (why use bootloader button on F

Originally FC's provide 2 solder pads for you to bridge when bootloader mode is required, a boot butto
makes it much easier.

Left: Boot Button; Right: Boot Pads

Soft Mounting

Soft mounting is a good practice to reduce vibrations transferred from the motors to the gyro. There ar
main types of soft mounting when it comes to mounting flight controllers: rubber standoffs and gromme

Learn more about FC soft mounting.

Flight Controller Choices

Here are my FC recommendations: https://oscarliang.com/top-5-best-fc-mini-quad/

For a complete list of flight controllers, here is a list I complied: https://docs.google.com/spreadsheets
/d/1VuBpQVZflz5zVNUG43qKTq4Mkwt-cTssWvb1CGqskQk/edit?usp=sharing

Edit History

- Dec 2014 – Article created
- Nov 2016 – Added choices of flight controller firmware, updated FC features

- Feb 2017 – Updated Processor and Gyro types
- Apr 2017 – Added “FC Evolution” infographics, Updated MPU types
- May 2018 – Updated info about FC integration
- Oct 2018 – Added info about mounting pattern
- Feb 2020 – URL Changed; Updated: FC Firmware, Gyro Info; Added: connection diagram/examp FC & Feature integrations explained, layout, camera control

BEGINNERS FC QUADCOPTER

previous post

How to Install LUA Script in Jumper T16

r

Review: DJI Digital FPV System – A Product, But Is It F

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69 COMMENTS

JORGE

13th January 2022 - 7:59 am

If I understand this, does it mean that you need at least 6 UARTs for a hexacopter, and at le for an octocopter? Based on your description even the F7 boards only have 7 UARTs. Wha options are there for 8+ UART boards?
Also, sometimes I see UARTs with only 2 pin slots and sometimes 3 pin slots (like your diag above). What is the role of the 3rd pin and what happens if you have an FC that only has 2 per UART? Thank you.

OSCAR

13th January 2022 - 1:00 pm

no, motor outputs and UART are two different things. For a hexacopter you need 6 outputs, and 8 for an octocopter. These have nothing to do with UART.

RYAN

14th October 2021 - 1:58 am

I've got a novice lll witch has a built in receiver and I'd like to change the controller. Can i ad different receiver to the board an where do you solder it in ?

HAMID

28th May 2021 - 2:11 pm

I wanna to replace my Cheerson CX-20 FC with a new and open source one with minimum changes to the drone (it has an APM 2.5 FC, gps mudule and seperated magnameter, and ArduCopter software on it).
Also I want to keep the Radio.
What's your recommendation?

JACK

12th August 2020 - 5:30 pm

Regarding the spreadsheet and looking at my Omnibus F4 v6 FC, it states it has “built-in P “built-in ESC”. Not true! I am unclear as to the spreadsheet definition, but I am using my de of “built-in PDB” to mean you can power the ESCs with it.

JIM

14th May 2020 - 8:19 pm

Newbie question.. Let’s say I buy a fairly high end radio. I know Crossfire needs a separate EXPENSIVE module attached to the radio itself. What protocols can I fly with this radio witl some sort of attachment? There is whole alphabet out there: rxsr- xm- xm+- pdq- rsvp- bbq am asking the right question. Thank you.

OSCAR

3rd June 2020 - 12:35 am

Depends on the radio, some radio comes with multi-protocol module that allows yo use many different protocols.
Check out the new TX16S i just reviewed.

REY DAVID APONTE

13th May 2020 - 2:52 am

hello good night i have a question with my flight controller,i buy a furious fpv flight controller dshot600 version and i want to installer in a racestar 4in1 esc and i dont have the map to combined the cables

TCHTHSKY

20th March 2020 - 11:00 am

And thanks for the vast amounts of info u put out there. yours was one of the first sites i exp in the very beginning and greatly helped me with this amazing journey.

TCHTHSKY

20th March 2020 - 10:55 am

if it hasnt been mentioned, openlager is a better choice to openlog for external blackbox re
Openlog is too slow for modern loop times. i've started using it and its great for that aweso
that has everything but integrated blackbox.
For those who r interested, theres a github site. wiring is simple; 5 v, g, rx from openlager t
on FC. Set the ports peripheral to Blackbox logging under Ports tab (betaflight) for the port
to on the FC, and change baud to 2000000. On first run, openlager will create a config file
sd card: edit it and change baud to 2000000. dont forget to set blackbox device to serial, u
Blackbox tab, and set your debug mode if needed (gyro scaled for noise analysis).

WALTER SZEMPRUCH

20th February 2019 - 7:57 pm

If I send you a board picture of a Flight Controller, would you be able to recognize the manufacturer?
Ultimately I'd like to be able to connect to the controller safely and read it's settings, but I d
know the software to use.
I thought I could contact the OEM and see if they would recommend how to "safely" chang
controller values myself.

JULIAN

18th September 2018 - 3:22 pm

Thanks so much Oscar!!!!
This article really helped me understand a lot about how to build my own drone.
Greetings from Argentina.

IOANNIS MOUTSATSOS

25th August 2018 - 2:57 pm

This is a really fine article! Thank your for your in depth research and attention to detail!

I found this article while searching for references to an idea that I have. I would like to take drone' with some descent specs like brushless motors, good batteries, long range Tx, and frame (I have an Altair Aerial Blackhawk for example) and upgrade to a programmable FC can add sensors, FPV, OSD and GPS.
What FC would you recommend for this? Would I be able to bind it to a stock Tx that come these drones? Even if I needed to add a dedicated FlySky or similar Tx/Rx would it be poss
Thanks for any feedback.

JUAN

23rd May 2018 - 10:22 am

Hello.
I would like to have a DJI Mavic or Robotics EVO drone, but they are way too expensive fo
I'm looking for something smaller than a Phantom or a Xiaomi Mi, but with obstacle avoida followme option and around 30min range.
Instead of buying an expensive branded model I could try to build one myself with a DIY kit the same specs but it's cheaper.
What set kit or spare pieces would you suggest to build it?
Desired specs:
30min flying time.
5km range.
Max Altitude at least 300m.
Foldable or small size. (like Mavic or less).
Optical stabilizated camera or gimbal.
FPV.
GPS.
Sensor avoidance.
Followme option.
I prefer smoothness to speed.

PATRICK

22nd June 2018 - 5:45 pm

It never cheaper to build your own. There is no way to get those features for less n than a mavic.

IMEMYSELF

13th March 2018 - 2:45 am

Oscar Liang,
I have read pages of information like this and tried to understand it, but with no luck. You pu your knowledge in the perspective of a newbie asking all kinds of stupid questions and you and very sorted-out narrative is helping a lot. I bet you dont get too much nice feedback an you do is free and come with no ties attached, on behalf on the community I am deeply gra your work and others who are contributing as best they can.

GOTHAM

17th May 2018 - 6:37 am

Great read,
I have query.
Can i use a Any flight controller for any size drone.
Example: The same Flight controller on a 2.4 Kg drone and a 24 Kg drone ?
I’m asking this because the ESC, Motor power rating will go up, so will the same F controller be able to function.

SAI POTHAN

16th December 2017 - 9:03 am

Sir ! I am building my first Quadrotor. I built the custom flight controller using Arduino Uno a MPU-9250. I have written PID Algorithm for single axis stabilisation of Quadrotor. But, the Quadcopter is not at all balancing. and it is oscillating always. Can you please help me rega my issue. Can you please say the meaning of Max. Effective Gyro Sampling Frequency. Ca attain stability if I switch to MPU-6050 instead of MPU-9250 ?.

Please help me, sir

Thank You.

ALEX WAGNER-JAUREGG

12th September 2017 - 4:36 pm

This is great information on the differences in flight controllers. I have the DYS F4 pro for m Fusion, and really like it. I'm trying to help a friend resurrect his hex-copter and would like t an F4 FC that will support a six motors, and has a betaflight OSD. Any recommendations?

OSCAR

18th September 2017 - 4:12 am

The XSRF4O we just reviewed recently can do what you ask :)

BROLIN

3rd September 2017 - 5:46 pm

Please advise me,

I have built my first quad and I have a little problem with the KK 2.1.5 board that I am using load increases i.e, when I increase the throttle the KK board restart. When I checked for the voltage the it restarts when the voltage drops to 6.1 volt. Is there a particular voltage for the board to restart ?

MT5000

31st July 2017 - 8:49 pm

Hello,

I have a KK board, but I'm having second thoughts. Anyone suggest a simple FC for basic not racing…yet. Just something that connects to Comp for settings, can hook up FPV and a cam. I have a 450mm frame. I don't know if this makes a difference, but I'd like to connect a at some point. Maybe by then I would just get an upgraded FC.

Thank you.

ASHER FLYNT

7th July 2017 - 5:26 pm

What is the name of the controller in the grid at the top of this page that is in the top left cor
have one and I cannot find documentation on it because it was given to me without it!! Plea

OSCAR

10th July 2017 - 6:00 pm

that's the KK2
A very old FC.

CHARLES

1st July 2017 - 9:58 pm

Who designed/created the first flight controller board for multrotors for hobbyists?

OSCAR

4th July 2017 - 6:34 pm

It's a mystery :)

HIMANSHU

12th June 2017 - 7:06 am

hii i am looking to build a drone for real time mapping would you be able to tell be which flig
controller should i use?

DDRT

7th March 2017 - 9:36 am

What about kk v5.5

KEENFLYER

7th March 2017 - 8:20 am

Hello and thanks for the great post. I am wanting to create a drone to do maintenance work skyrise buildings and it will need to work in close proximity to the building without hitting it (meter range). Do you have any advice for flight controllers for the following;
a) Human operated with collision avoidance so it doesnt hit the building, or
b) Computer operated with collision avoidance
Many thanks in advance.

KUKUMEKA

1st February 2017 - 4:42 am

Which FC is more suitable to lift payload of 5lb even though they are not placed in balance positions and lift platform 4 feet off ground

DEBO

15th January 2017 - 7:43 am

Hi oscar,
Great post as usual. so oscar, i would like to know whats the difference between apm and pixhawk? are they just like the naze32 and flip32(flip being a naze clone)?
thanks in advance

OSCAR

21st January 2017 - 6:11 pm

Here: http://intofpv.com/t-difference-between-apm-and-pixhawk

JUANESM

1st April 2016 - 9:34 pm

Hi guys…. Question: Do you think that Jiyi P2 is bad alternative ?

DR COLIN LLOYD

17th March 2016 - 6:07 pm

Hi Oscar,

This explanation has been both instructive and confusing for me when trying to choose an
am currently building an ImmersionRC Xugong V2 Pro folding quadcopter. I want this as a
backpackable hobby (i.e. not professional) video/photo “follow-me” quadcopter when I am
in hills/mountains etc.

I seem to have two options – either a normal RC Tx control or (my preference) a Tablet cor
don’t need FPV, racing or acrobatic capability. Either way my FC board has to have GPS ca
– either internal or external. But I’m not sure which is the best route. I’m capable of
hardware/software setups within the Raspberry Pi/Arduino arena – but with all the other
possibilities of things going wrong when assembling a quadcopter from scratch – I probably
like to start with a known quantity as far as the FC is concerned. At this stage I’d rather star
budget board -see what happens and then go up the ladder as I become more knowledgea
far as capability/ease of use etc is concerned.

OSCAR

18th March 2016 - 9:53 am

it sounds like you should be looking at the APM / Pixhawk route, however I am not
with that area yet, currently i fly mostly acro boards :)

NIVASH

29th February 2016 - 8:25 pm

Hi Oscar

Please advise me

I have a flip32 and need to connect to a X8R receiver. The receiver connects with Sbus as

Can I use a Sbus to cppm decoder to complete my setup. Or what can I do

Thankx

OSCAR

7th March 2016 - 4:35 pm

yes a SBUS to CPPM decoder is probably the simplest solution for you, and shoul fine.

SUHAAS

26th February 2016 - 4:49 pm

Hi Oscar,

I want to build my first quadcopter i hav got all my materials but struck wit the fc ..my only specification regarding my quadcopter is that it must be completely flexible for me to contrc any manner .like for ex: it must not just fly and land but also perform all acrobatics like flip , flight ..I hope u got me …. i was suggested a KK v5.5 FC ,,wil this work or should I use son …mail me if any suggestions ..

Kindly help

GUST

16th February 2016 - 5:05 pm

Is this a good FC? http://www.banggood.com/Naze32-Flight-Controller-With-32-bit-STM32-Multicopter-10Dof-p-953849.html?p=OY2106728901201408U4

I will make my own quadcopter but ik don't know which stuff I need, I am a novic. Can you me?

OSCAR

22nd February 2016 - 10:56 am

HI Gust,

yes it should work fine with Cleanflight firmware :)

by the way, I recommend joining this forum, it's very useful and there are lots of he

people there. I am a daily user too :) http://intoFPV.com

GAURAV

9th February 2016 - 7:01 pm

hi oscar, i want to make a quadcopter with gps and camera so which flight controller i can u

ZUKENJ

13th January 2016 - 9:29 pm

Hi Oscar,

I know this article is some how old, but I am building a quad 450 and I am thinking on the A

AM 2.8 or the OpenPilot CC3D Revolution Revo 10DOF STM32F4.

Wandering if you can recommend one, links to vendors:

APM 2.8:amazon.com/Hobby-Ace-Apm2-8-Controller-Absorber-Multicopter/dp/B015CPDD

/ref=sr_1_2?s=toys-and-games&ie=UTF8&qid=1452720299&sr=1-2&keywords=APM+2.8

AMP 2.6: amazon.com/Andoer-Flight-Controller-Multicopter-Quadcopter/dp/B00Q496EOM

/ref=sr_1_1?s=toys-and-games&ie=UTF8&qid=1452720493&sr=1-1&keywords=APM+2.6

CC3D Revo: banggood.com/OpenPilot-CC3D-Revolution-Revo-10DOF-STM32F4-Flight-Controller-Staight-Pin-p-1000068.html

I really appreciated your help.

MACFLY1202

9th January 2016 - 11:27 am

Hi Oscar,

Perhaps you could has the Pixfalcon and Pixracer ? They are Stm32f4 series.

Thanks for your great and outstanding blog.

PABLO

24th November 2015 - 9:42 am

Hi Oscar,

I'm building a F550 hexacopter and I have the motors,ESC,propellers,frame and battery, bu know how to choose a good and cheap flight controller.I've seen the APM 2.8 and Flip32. W do you recommend?Or another model?.I'd like to include a GPS or telemetry in the future t the option to return home.

Thanks.

OSCAR

24th November 2015 - 6:26 pm

if you want GPS and return to home, APM or Naza is your friends.

PABLO

25th November 2015 - 8:50 am

So I'll buy APM 2.8, will be ok a transmitter and receiver with 6 channels?

Thanks.

PABLO

26th November 2015 - 8:00 am

Hi Oscar,

Will be possible with Apm 2.8 with gps M8N to have return home and fail s with 6 channels transmitter and receiver.I read that is also possible the op follow you, What is necessary for this?

Thanks.

GIORGIO DI LELLA

21st October 2015 - 9:41 pm

Hi Oscar,

I am presently building a DJI 550mm Hexacopter. I presently have a quad that I picked up u
came with 1000Kv motors, 30 Amp ESC a KKK2.0 Flight Controller board.
I would like a FPV Setup with all the options available from the start…GPS, Compass and t
"Return To Home" feature, and so on. Most suggest the Naza system. I see others also but
know were to begin.
All I want to do is fly over trees and record the video.
Thx.

OSCAR

26th October 2015 - 11:38 am

yea… both Naza and APM are good choice for GPS…

OSCAR JR.

3rd October 2015 - 2:08 pm

Hi Oscar, here is Oscar too!
Thanks for sharing those valuable informations. I just wanna know about SLT protocol and
FC, is there anyone compatible with ? I have this Tactic TTX650 with TR625 Rx and I'm int
to use a MultiWiiPro or a Naze32 Full in a RoboCat 275. What do you think, will it work?
Cheers!

OSCAR

6th October 2015 - 4:27 pm

Hey Oscar ;-p
sorry i know nothing about SLT!

RAY TILLMAN

23rd September 2015 - 2:53 pm

Hi Oscar,

I think its wrong to bad mouth someone you have never dealt with on the word of people w might have alterior motives. I am of course talking about your timecop comments. I had a d naze32 when he first started producing them and he sent me a replacement , no argument asked if i would mind sending him the bad board back so he could see what went wrong. R i bought four afromini's and he sent me a free acro naze32. You have to remember that his was never meant for people like me(hobbyist) but as a base for stm32 development types. he doesnt suffer fools gladly but as long as you read the manual first and try to solve your p yourself first, he is fine. He has always treated me with respect and courtesy and most peo is short with ask him stupid questions that normal people would google first. When he first developed the naze32 it was a clone/reworking of a Chinese 32 bit board called FreeFlight really didnt want to go into production full time as he was just a hobby flyer who saw the lim of 8 bit technology and wanted to move on to a 32 bit FC's but within the multiwii communit developed Baseflight from scratch and the naze32 grew from the FreeFlight board. Its a ho him, he never wanted the naze32 to get so big and take up so much of his time . If you che to his break with rcgroups (who treated him abysmally) he makes it clear he doesn't need t money or the hassle involved , its just a hobby project that grew out of hand. In the beginni was Open Pilot with 32 bit boards that cost £100 there was no choice then. Now because c naze32 and its derivatives i can get a board for less than £15 And its better, and mainly bec timecop. So dont knock what you dont know !

OSCAR

23rd September 2015 - 3:08 pm

Hi Ray, thanks for your comment, and sorry if I hurt your feeling. I was totally just describing what I have observed, none of my words about Timecop are personal. Y right, he did some amazing work about Naze32. Please see Baseflgith VS Cleanfli more information.

MRSATOV

31st August 2015 - 1:32 pm

Hi Oscar, been a while since we chatted. XD

Nice article. I know it's old, so it's probably expected to be a little out of date.
There are also some very valid DIY boards for those who are not afraid of such things. Flyi
DiscoveryF3 and DiscoveryF4… several. Of course, the Sparky series are actually openso
same as CC3D was, and you can even have the boards made on oshpark.com, buy all the
and pieces, solder them on yourself and VOILA, a homemade Spark v1 or v2. XD Except,
checked, it costs pretty much the same if you're doing 1-3 boards anyway, so may as well j
a ready made one.
My advice to newcomers is to watch aliexpress.com for sales on the Sparky v1.1. They car
for about $26 – $28 if you wait and watch. I've bought two this way. You could pay half for a
clone, and that will get you flying, but it won't do GPS return to home, or anything like that.
Naze32/Flip32 10dof will, but there are features that already are not supported on them, ar
are crappy clones anyway. True that what I got off aliexpress are clones, but I can vouch fo
fact that the quality is good, and performance is noticeably better than any F1 board. Can't
that value.

OSCAR

1st September 2015 - 11:14 am

Great info, thanks so much :)
I need to update this post, but just haven't got the time yet :) soon, my friend, soon

PRATIK

11th August 2015 - 7:03 pm

Hi Oscar,
I want to build a quadcopter with the following specification : FPV, Sensor and Tracking(gp
system).. which FC should i use to make the quad witht he above mentioned specs.
Plz reply ,or email me… any help or suggesion would help me.
NOTE : A quadcopter that has GPS + FPV + Tracking sytem! .. All in One bro ;)

OSCAR

12th August 2015 - 4:53 pm

APM? Crius AIO Pro?

PRATIK

12th August 2015 - 7:39 pm

What do u suggest according! …
the FC should help in Tracking as well as sensing part.. FPV is an ad on.
It should help me stabilize my quad..!!
This will be my Final Year project,,,so plz suggest ur expert ideas :)

GUSTAVO A GONALEZ

1st August 2015 - 3:10 pm

Hi Oscar,
I am currently in a Senior Design group and our project revolves around a quadcopter. In o
design report we need to describe and outline some possible decisions between Flight Cor
and your post has helped immensly in that regard. I would like to ask if we could use your c
(with credit of course) in our report?

OSCAR

6th August 2015 - 12:27 am

sure that's fine :)
if you could credit back that would be great !

RAFAK

29th June 2015 - 2:06 am

bro… awesome review, comparison charts just help SO MUCH, my mind was already kind
up about the Naze32 Full, your post was just the missing OK TO GO! … lol …… im newbie
this quadcopters thing and looking to build my first 250mm FPV and i have a very newbie q
…. what should i look for,, vertical or horizontal pins on the FC? (considering im going for a

quad frame) …. ty so much bro…your blog is AWESOME!!!

EPASKO

26th May 2015 - 11:10 am

need a TX for all of these

I hope this what I got will work

please say yes I will donate!

I canhttps://www.banggood.com/index.php?com=account&t=ordersDetail&ordersId=64476

them separate

any recommend?

Steerix x4 quad I Have

My 250 build I want as per your recommend

Syma X5c 2.4g Naze Acro

Flip32 ?

OSCAR

28th May 2015 - 9:14 am

i can’t see your link, it’s your order and only you can see it.

send me the product page or product name please.

for Flight controller, get the Naze32 acro :)

ALESSANDRO

10th March 2015 - 4:55 pm

is good the CC3D from Banggood for a 450 quad?

OSCAR

10th March 2015 - 8:17 pm

yes, the cc3d is good for 450 quad too!

APMFRIEND

25th December 2014 - 1:15 pm

Please also note, that APM/ArduCopter has a much improved Acro Mode since 3.1 – wher comparing it to Multiwii it feels nearly identical. You are right though – on earlier implement before 3.1, Acro Mode on APM was not so good! :)

OSCAR

28th December 2014 - 7:55 pm

cheers, thanks! :D

CRAZYCODER

24th December 2014 - 11:39 pm

The Brain FPV has integrated OSD hardware which is handy, butvery little market share fo reason.
It was released last week. Of course it has little market share.

CRAZYCODER

24th December 2014 - 2:15 pm

“Sparky, Quanton and Brain FPV Flight controllers were all based on OpenPilot’s project.” This is not correct. Naze32 is based on MultiWii, being a 32-bit port of MultiWii. Sparky, Qu and Brain FPV are using Tau Labs firmware which is a fork of OpenPilot.

FACEBOOK TWITTER INSTAGRAM

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